

Dear Attendee,

Thank you for joining us in San Diego for our *TDWI World Conference—Fall 2003*, and for participating in our conference evaluation. Even with all the activities available in San Diego, classes were filled all week long as everyone made the most of the wide range of full-day, half-day, and evening courses; Guru Sessions; Peer Networking; the BI Strategies program, and our new certification events.

We hope you had a productive and enjoyable week in San Diego. This trip report is written by TDWI's research department, and is divided into nine sections. We hope it will provide a valuable way to summarize the week to your boss.

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I. Conference Overview -----

For our Fall Conference, our largest contingency of attendees came from the United States, but we had visitors from Canada, Mexico, Europe, Asia, Africa, and South America. This was truly a worldwide event! Our most popular courses of the week were “Business Intelligence Fundamentals,” parts I & II, followed by TDWI’s “Business Intelligence Strategies Program,” “Meta Data Strategies for Large Corporations,” and the “Hands-On Labs.”

Business intelligence and data warehousing professionals devoured books for sale at our Membership desk. The most popular titles were:

- *Mastering Data Warehouse Design*
- *Data Warehouse Toolkit*
- *Corporate Information Factory*
- *Business Intelligence Roadmap*
- *Data Modeler's Workbench*

II. Quarterly Technology Survey -----

By Wayne W. Eckerson, TDWI Director of Education and Research

TDWI distributed a one-page survey on BI consolidation at the San Diego World Conference. The survey results indicated that a large percentage of companies want to shrink the number of BI tools in use to cut costs, simplify usage, and deploy on an enterprise scale. Here are the highlights:

***To what degree does your organization want to standardize its BI portfolio? (Check one)**

Very High	18.90 %
High	38.41 %
Medium	20.12 %
Low	14.63 %
Very Low	3.66 %

***When will your organization standardize its BI portfolio? (Select one)**

We've already standardized on a set of BI tools	25.61 %
Within 12 months	19.51 %
Within 24 months	14.02 %
24+ months	5.49 %
Not sure	21.95 %
We have no plans to standardize our BI toolset	9.15 %

***How many distinct BI tools are used in your organization:**

Mean (Avg): 3.39; Minimum: 1.00; Maximum: 14.00; StDev: 2.4142

***What is driving your organization to standardize its BI tools? (select all that apply)**

We aren't trying to standardize our BI tools	9.87 %
Deploy BI on an enterprise scale	39.91 %
Reduce support costs	37.67 %
Other	7.17 %

“Other” Responses:

- Vendor of BI tools
- BI Market/Vendors offerings have changed
- Organizational consolidation
- We want "one number"
- Reduce development costs
- Improve end user access and ease to use
- Common interface from role to role
- Hoping to install software/system
- They will be standard for DW
- Remove the "what tool" question from every BI project invocation.
- Increase productivity of users
- End user confusion, maintenance out
- Deploying BI as a value add to our core product
- Reduce user training
- They talk about it, but no plans or actual reasons are put forth publicly
- Increase technical expertise by focusing on fewer tools

III. Keynotes-----

Monday, November 3: Future Trends: The Evolution of Data Warehousing and Business Intelligence

Dr. Barry Devlin, Distinguished Engineer, IBM Corporation

Barry Devlin's opening keynote address challenged even the most experienced business intelligence and warehousing professionals to look beyond the traditional boundaries of data warehousing. Devlin, a thought leader in data warehousing from its beginning, described the dimensions of decision-making as breadth (ability to get consistent information from the widest variety of sources), depth (ability to get to the most granular level of information), and timeliness (ability to get the most immediate information available). He stressed that much has changed in the fifteen years since the beginning of data warehousing, bringing about demands for faster information delivery, more kinds of information, greater detail, and stronger integration.

Each of these demands, said Devlin, is driven by real business changes—more adaptive business processes, blurred lines between strategic and tactical decision-making, convergence of operational and informational systems, and increasing importance of unstructured data. These changes increase the pressure to extend support capabilities for each of the three decision-making dimensions – timeliness from near-real-time to real-time information, depth from macro-detail to micro-detail, and breadth from structured and trusted data to unstructured and un-trusted data. Extending information services along each dimension is the next step in the continuing evolution of data warehousing.

While technology will play an important role—especially federated access tools and metadata interchange technology—the real challenge for the next evolutionary step is increased integration around the data warehouse. Increased integration with operational systems leads to more timely information and cohesion from operational to informational processes. Extended integration with information sources leverages relationships with partners, customers, and regulatory agencies. Increased integration of knowledge links information with meaning and usage, removing language and regulatory barriers to effective communication and decision-making.

Thursday, November 6: Here's to Your Success

Claudia Imhoff, President, Intelligent Solutions, Inc.

The final keynote address for the week was provided by Claudia Imhoff, a well-known data warehousing author, innovator, and consultant. Recognizing the reality that many attendees are “learning saturated” as we approach the last days of a conference, Imhoff delivered an invigorating discussion of next steps that put all of the learning together and help to ensure data warehousing success. This address focused on five key success factors:

1. **Sponsorship** – Imhoff emphasized the need to recognize multiple sponsors. Different kinds of partnerships exist in successful BI programs, and each needs to be nurtured. Two kinds of critical sponsorships must exist – business sponsorship and IT sponsorship. Lack of sponsorship leads to wasted time, wasted effort, and wasted money.
2. **Program vs. Project** – Distinguishing between programs and projects is important to BI success. Although BI is deployed through projects, it is sustained through program management. Projects are one-time, short-term efforts with specific perspective. They have a finite beginning and a finite ending. Programs are ongoing, long-term processes that evolve over time and are executed continuously. Architecture, standards, strategy, and reuse are among the key program management responsibilities. Implementing a program management office (PMO) is one of Imhoff’s recommended practices for long-term BI success.
3. **Who Funds What?** – Imhoff summarized the CIF architecture and reduced it in the simplest terms as “getting data in” and “getting information out.” The objectives of getting data in are integration, quality, and visibility. The goals of getting information out are legibility, capability, and security. This distinct separation of goals and of architecture leads to an equally simple recommendation for funding: Getting data in is centrally funded by IT; Getting information out is funded by the business community of information consumers.
4. **Data Quality** – Attention to data quality is another of the recommended practices to ensure BI success. Imhoff stressed attention to quality throughout the data warehousing process from quality of source data to quality of delivered information. In a complex data warehousing environment it is impractical to believe that you can deliver completely consistent, error-free data and information. The goals of data quality management are to discover errors and inconsistencies before the business users find them, to fix causes as well as correcting data, and to provide a feedback system.
5. **The Information Workshop** – Most innovative and visionary of all the keynote recommendations was evolution of an information workshop. Connecting multiple data marts with many business users, technical administrators, and business processes creates a complex network of services and dependencies. Organizing the capabilities, disseminating the knowledge, and automating workflow and processes are achieved through the information workshop.

Attention to each of these recommendations, concluded Imhoff, provides context for the many things learned through the week and helps to ensure success of the BI program.

IV. Course Summaries-----

Sunday, November 2: TDWI Business Intelligence Fundamentals, Part I: Introduction to Business Intelligence and Data Warehousing

Karolyn Duncan, Principal Consultant, Information Strategies, Inc., and TDWI Fellow

This course promoted the common language, consistent definitions, shared expectations, and mutual understanding needed to foster strong teamwork and cohesive results in DW teams and BI programs. Based on three frameworks—BI components, technology, and organizational—the course provided a comprehensive overview of business, technical, and cultural implications of business intelligence and data warehousing.

Attendees learned:

- The factors that contribute to maximum business value
- Six common kinds of business applications of BI/DW
- Key elements and common applications of business analytics
- Variations in data warehousing data stores, architectures, and processes
- Data warehousing roles and responsibilities
- An overview of DW/BI tools and technology
- Best practices and common mistakes in BI/DW programs

Sunday, November 2: Building Successful Data Warehouses Using Rapid Development Techniques (half-day course)

Pieter Mimno, Principal, Mimno, Myers & Holum

A critical issue for business and IT managers is selection of an appropriate development methodology for a data warehousing project. The question addressed by this course is should you use a top-down, bottom-up, or hybrid approach to build your DW application?

As described in the course, the top-down approach often requires a lengthy, up-front effort to interview business analysts, define functional requirements, and specify portions of the enterprise data model for the central data warehouse. Top-down techniques may also require implementation of numerous, large, normalized, relational target databases, including a central data warehouse, Operational Data Store, Persistent Staging Area, and additional databases, such as an Exploration Warehouse. Although applications may be built using iterative development techniques, the top-down methodology often results in high development expense, a lengthy development period, and deferral of ROI.

A hybrid bottom-up development methodology, as discussed in the course, is an alternative to top-down development. The bottom-up methodology supports business requirements to build applications iteratively and achieve rapid ROI. To avoid data mart chaos, individual data marts are embedded within a long-term enterprise data warehousing architecture that is specified early in the project. The development effort is controlled through use of incremental, enterprise data modeling techniques, and all components of the architecture are integrated with central meta data, generated and maintained by an ETL tool.

A twelve-step, hybrid, bottom-up development methodology, described in the course, has been used successfully to develop data marts as incremental, fixed cost, fixed time, development efforts. The first five steps of the methodology represent a top-down process, directed toward definition of global functional requirements, specification of an enterprise data warehousing architecture, selection of DW components, and modeling of the initial data mart to be developed. The remaining seven steps implement an incremental, bottom-up development process.

The course stimulated a great deal of discussion about the relative merits of top-down and bottom-up development techniques. Many attendees agreed that a hybrid methodology, composed of the best features of both top-down and bottom-up development techniques is the best approach.

Sunday, November 2: Evaluating ETL and Data Cleansing Tools (half-day course)

Pieter Mimno, Principal, Mimno, Myers & Holum

A central issue that was discussed at length in this course was the role of ETL tools in extracting data from multiple sources, resolving inconsistencies in data sources, and generating a clean, consistent source of data for DSS applications. About 2/3 of the attendees used an ETL tool in past implementations, which is consistent with the Technology Survey conducted by Wayne Eckerson. Many attendees verified that monitoring hand-coded ETL code can be very expensive and does not produce sharable meta data. The inevitable result is the development of “stovepipe” data marts that are difficult to maintain.

The majority of the course focused on an evaluation of the strengths and limitations of leading ETL tools. An important objective of the course was to narrow down the list of ETL tools that would be appropriate for an organization, and to furnish attendees with challenging questions to ask vendors in the Exhibit Hall.

The course included detailed descriptions of the strengths and limitations of leading ETL products, as well as filled-out functionality matrices for the most widely used products. The product descriptions generated a lot of discussion from attendees on their experience with specific products.

Sunday, November 2: The Missing Link: Value-Based Requirements Gathering (half-day course)

Norm Mackay, Director—Business Intelligence, Fujitsu Consulting

This half-day course charted a benefits-driven approach to the development of BI solutions that can provide the often missing link between business value and data warehouse. Illustrated by real-world examples and a case study, an approach and a number of practical techniques were presented that directly tied business value to the data warehouse. While the class focused on gathering user requirements, it assisted with all stages of design, development, and enhancement of a BI solution and could be useful whether attendees were just starting their journeys or already had data warehouses in production.

Attendees learned:

- The distinction between data warehousing and business intelligence
- An approach and techniques to identify and achieve the business value of a data warehouse
- How to use the value proposition to collect user requirements
- Practical tips and hints through examples and a case study

Sunday, November 2: Building and Implementing Data Stewardship and Governance Programs (half-day course)

Robert S. Seiner, President and Principal, KIK Consulting & Educational Services; and Publisher, The Data Administration Newsletter

Most companies already have informal levels of data stewardship and governance in their organizations. This half-day workshop from Robert S. Seiner focused on teaching companies how to formalize accountability for information assets through pragmatic and practical steps that include the development of a governance repository, how to clearly define roles & responsibilities, how to identify and record “de facto” steward information, and how to add-value at key touch points and disciplines in the data life-cycle.

Key points covered in the workshop included ...

- How to leverage the 3-Ds of data stewardship - "de facto", "discipline", and "database"
- How to design a pragmatic data stewardship program without breaking the bank
- How to define and identify stewardship program management roles and steward role and responsibilities
- How to develop a conceptual meta-data model and change plan to support stewardship
- How to define measures and metrics of data stewardship success

Sunday, November 2: Designing a High-Performance Data Warehouse

Stephen Brobst, Managing Partner, Strategic Technologies & Systems

Stephen Brobst delivered a very practical and detailed discussion of design tradeoffs for building a high performance data warehouse. One of the most interesting aspects of the course was to learn about how the various database engines work “under the hood” in executing decision support workloads. It was clear from the discussion that data warehouse design techniques are quite different from those that we are used to in OLTP environments. In data warehousing, the optimal join algorithms between tables are quite distinct from OLTP workloads and the indexing structures for efficient access are completely different. Many examples made it clear that the quality of the RDBMS cost-based optimizers is a significant differentiation among products in the marketplace today. It is important to understand the maturity of RDBMS products in their optimizer technology prior to selecting a platform upon which to deploy a solution.

Exploitation of parallelism is a key requirement for successfully delivering high performance when the data warehouse contains a lot of data—such as hundreds of gigabytes or even many terabytes. There are four main types of parallelism that can be exploited in a data warehouse environment: (1) multiple query parallelism, (2) data parallelism, (3) pipelined parallelism, and (4) spatial parallelism. Almost all major databases support data parallelism (executing against different subsets of data in a large table at the same time), but the other three kinds of parallelism may or may not be available in any particular database product. In addition to the RDBMS workload, it is also important to parallelize other portions of the data warehouse environment for optimal performance. The most common areas that can present bottlenecks if not parallelized are: (1) extract, transform, load (ETL) processes, (2) name and address hygiene—usually with individualization and householding, and (3) data mining. Packaged tools have recently emerged in to the marketplace to automatically parallelize these types of workloads.

Physical database design is very important for delivering high performance in a data warehouse environment. Areas that were discussed in detail included denormalization techniques, vertical and horizontal table partitioning, materialized views, and OLAP implementation techniques. Dimensional modeling was described as a logical modeling technique that helps to identify data access paths in an OLAP environment for ad hoc queries and drill down workloads. Once a dimensional model has been established, a variety of physical database design techniques can be used to optimize the OLAP access paths.

The most important aspect of managing a high performance data warehouse deployment is successfully setting and managing end user expectations. Service levels should be put into place for different classes of workloads and database design and tuning should be oriented toward meeting these service levels. Tradeoffs in performance for query workloads must be carefully evaluated against the storage and maintenance costs of data summarization, indexing, and denormalization.

Sunday, November 2: Fundamentals of Business Analytics

Michael L. Gonzales, President, The Focus Group, Ltd.

It is easy to purchase a tool that analyzes data and builds reports. It is much more difficult to select a tool that best meets the information needs of your users and works seamlessly within your company’s technical and data environment.

Mike Gonzales provides an overview of various types of OLAP technologies—ROLAP, HOLAP, and MOLAP—and provides suggestions for deciding which technology to use in a given situation. For example, MOLAP provides great performance on smaller, summarized data sets, whereas ROLAP analyzes much larger data sets but response times can stretch out to minutes or hours.

Gonzales says that whatever type of OLAP technology a company uses, it is critical to analyze, design, and model the OLAP environment before loading tools with data. It is very easy to shortcut this process, especially with MOLAP tools, which can load data directly from operational systems. Unfortunately, the resulting cubes may contain inaccurate, inconsistent data that may mislead more than it informs.

Gonzales recommends that users model OLAP in a relational star schema before moving it into an OLAP data structure. The process of creating a star schema will enable developers to ensure the integrity of the data that they are serving to the user community. By going through a rigor of first developing a star schema, OLAP developers guarantee that the data in the OLAP cube has consistent granularity, high levels of data quality, historical integrity, and symmetry among dimensions and hierarchies.

Gonzales also places OLAP in the larger context of business intelligence. Business intelligence is much bigger than a star schema, an OLAP cube, or a portal, says Gonzales. Business intelligence exploits every tool and technique available for data analysis: data mining, spatial analysis, OLAP, etc. and it pushes the corporate culture to conduct proactive analysis in a closed loop, continuous learning environment.

Monday, November 3: TDWI Business Intelligence Fundamentals, Part II: Business Intelligence Architectures and Data Warehousing Methods

Karolyn Duncan, Principal Consultant, Information Strategies, Inc., and TDWI Fellow

This course sorted out some of the confusion about data warehousing architectures and methodologies. Many data management architectures—ranging from the “integration hub data warehouse” to “independent data marts”—can be used successfully to deploy business intelligence. And many approaches—including top-down, bottom-up, and hybrid methodologies—may be used to develop the data warehouse. The course reviewed common combinations of architecture and methodology including enterprise oriented, data mart oriented, federated, and hybrid approaches. Each approach was evaluated for strengths and weaknesses based on twelve factors (such as time to delivery, cost of deployment, strength of integration, etc.). Three strong messages were conveyed throughout the course:

- There is no single “right” way to develop a data warehouse.
- You must know your organization’s needs and priorities to choose the best approach.
- Most of us will end up using a hybrid approach.

The course concluded by offering guidance to assess an organization’s unique needs and priorities, and describing techniques to define a hybrid architecture and methodology.

Monday, November 3: Very Large Data Warehouses (Hundreds of Gigabytes to Multi-Terabytes): Concepts and Architectures

Daniel Linstedt, Chief Technology Officer, Core Integration Partners, Inc.

Geared to those responsible for growing, maintaining, or building large data warehouses, this course covered how to manage the impact of large data volumes on various aspects of a data warehousing architecture. It examined how to design data models, hardware platforms, load utilities, SQL queries, storage systems, and database management systems to optimize performance and gracefully scale a data warehouse to hundreds of gigabytes or terabytes of data. The course also examined organizational issues

involved in large-scale data warehouses, including how to set and manage expectations, skill sets required to maintain and grow the environment, and project management considerations.

Attendees Learned:

- Organizational challenges, project challenges, mitigation and planning strategies
- How to optimize hardware and software environments to handle large data volumes
- When VLDW meets near-real-time (RT, ZLE)
- Introductory Topic: Over the Bleeding Edge—From the Active to the Very Large Dynamic Warehouse

Monday, August 18: What Business Managers Need to Know about Business Intelligence

Jill Dyché, Senior Partner, Baseline Consulting Group

Jill Dyché kicked off her full-day session with some examples of hard-won lessons learned and some cases of data warehousing gone bad (including an alarming story of what happened when one hotel chain forgot about business sponsorship). The rest of the day included a broad collection of real-life case studies of companies who had both succeeded and failed with their data warehouse initiatives. Jill delivered an often tongue-in-cheek take on the evolution of business intelligence and its accompanying best practices, thwarting what she calls “the convention wars” and espousing a business-driven approach to business intelligence.

She made several notable observations about the value of business intelligence throughout the day, including:

- Corporate strategic objectives are driving data warehousing more than ever, but new (and costly!) applications like ERP and CRM are demonstrating its value
- Organizational issues can sabotage a data warehouse, as can lack of clear job roles.
- As business intelligence evolves, organizations are vying for data ownership, culminating in the need for an Information Center of Excellence.
- Return on Investment is no longer exclusive to new BI projects—many managers are being asked to re-justify their data warehouse investments.
- That for data warehousing to really be valuable, the company must consider its data not just an enabler, but as a corporate asset.

Jill introduced the concept of the Business Intelligence Portfolio and illustrated the incremental deployment of the portfolio in a typical organization. The workshop included a series of interactive surveys so that attendees could gauge their progress on the BI best practice continuum. Several shared both their successes and frustrations (hint: the latter were mostly about organizational ownership and what Jill calls The “P” Word—politics!). The workshop concluded with a set of market predictions for forging the BI future.

Monday, November 3: Real-Time Data Warehousing

Stephen A. Brobst, Managing Partner, Strategic Technologies & Systems

The goal of an enterprise data warehouse is to provide a business with analytical decision-making capability for use as a competitive weapon. Traditional data warehousing focuses on delivering strategic decision support. Having a single source of truth for understanding key performance indicators (KPIs) with sophisticated what-if analysis for developing business strategy has certainly paid big dividends in competitive marketplace environments. Data mining techniques further refine business strategy via advanced customer segmentation, acquisition and retention models, product mix optimization, pricing models, and many other similar applications. The traditional data warehouse is typically used by decision-makers in areas such as marketing, finance, and strategic planning. The goal of Real-Time Data Warehousing is to increase the speed and accuracy with which decisions are made in the execution of

strategies developed in the corporate ivory tower through deployment of tactical decision support capability.

Delivery of tactical decision support from the enterprise data warehouse requires a re-evaluation of existing service level agreements. The three areas to focus on are data freshness, performance, and availability. In a traditional data warehouse, data is usually updated on periodic, batch basis; refresh intervals are anywhere from daily to weekly. In a tactical decision support environment, data must be updated more frequently. For example, while yesterday's sales figures shouldn't be needed to make a strategic decision, access to up-to-date sales and inventory figures is crucial for effective (tactical) decisions on product markdowns. Batch data extract, transform, load (ETL) processes will need to be migrated to trickle feed data acquisition in a tactical decision support environment. This is a dramatic shift in design from a pull paradigm (based on batch scheduled jobs) to a push paradigm (based on near real-time event capture). Middleware infrastructure, such as publish and subscribe frameworks or reliable queuing mechanisms, is typically an essential component for near real-time event capture into a real-time data warehouse.

The stakes also get raised for the performance service levels in a tactical decision support environment. Tactical decisions get made many times per day and the relevance of the decision is highly related to its timeliness. Unlike a strategic decision which has a lifetime of months or years, a tactical decision has a lifetime of minutes (or even seconds). Tactical decisions must be made in seconds or small numbers of minutes. Of course, a tactical decision is typically more narrowly focused than a strategic decision and thus there is less data to be scanned, sorted, and analyzed. Furthermore, the level of concurrency in query execution for tactical decision support is generally much larger than in strategic decision support. Clearly, there will need to be distinct service levels for each class of workload and machine resources will need to be allocated to queries differently according to the type of workload.

Availability is typically the poor step child in terms of service levels for a traditional data warehouse. Given the long term nature of strategic decision-making, if the data warehouse is down for a day the quantifiable business impact of waiting until the next hour or day for query execution is not very large. Not so in a tactical decision support environment. Incoming customer calls are not going to be deferred until tomorrow so that optimal decision-making for customer care can be instantiated. Down time on an active data warehouse translates to lost business opportunity. As a result, both planned and unplanned down time will need to be minimized for maximum business value delivery.

Some parts of the end user community for the real-time data warehouse will want their data to reflect the most up-to-date information available. This kind of data freshness service level is typical of a tactical decision support workload. On the other hand, when performing analysis for long-term decision-making the stability of information as of a defined snapshot date (and time) is often required to enable consistent analysis. In a real-time data warehouse, both end user communities need to be supported. The need to support multiple data freshness service levels in the enterprise data warehouse requires an architected approach using views and other advanced RDBMS tools to deliver a solution without resorting to data redundancy. Moreover, views and the use of semantic meta data can hide the complexity of the underlying data models and access paths to support multiple data freshness service levels.

Real-time data warehousing is clearly emerging as a new breed of decision support. Providing both tactical and strategic decision support from a single, consistent repository of information has compelling advantages. The result of such an architecture naturally encourages alignment of strategy development with execution of the strategy. However, a radical re-thinking of existing data warehouse architectures will need to be undertaken in many cases. Evolution toward more strict service levels in the areas of data freshness, performance, and availability are critical.

Monday, November 3: Assessing and Improving the Maturity of a Data Warehouse (half-day course)

William McKnight, President, McKnight Associates, Inc.

Designed for those who had a data warehouse in production for at least 2 years, the initial run of this course gave the students 22 criteria with which to evaluate the maturity of their programs and 22 areas of ideas that could improve any data warehouse program that was not implementing the ideas now. These criteria were based on the speaker's experience with Best Practice data warehouse programs and an overarching theme to the course was preparation of the student's data warehouse for Best Practices submission.

The criteria fell into the classic 3 areas of people, process and technology. The people area came first since it is the area that requires the most attention for success. Among the criteria were the setup and maintenance of a subject-area focused data stewardship program and a guiding, involved corporate governance committee. The process dimension held the most criteria and included data quality planning and quarterly release planning. Last, and not least, was the technology dimension. Here we found evidence discussed for the need for "real time" data warehousing and incorporation of third-party data into the data warehouse.

Monday, November 3: How to Justify a Data Warehouse Using ROI (half-day course)

William McKnight, President, McKnight Associates, Inc.

Students were taught how to navigate a data warehouse justification by focusing their data warehouse efforts on its financial impacts to the business. This impact must be articulated on tangible, not intangible, benefits and the students were given areas to focus their efforts on that could be measured. Those tangible metrics, once reduced to their anticipated impact on revenues and/or expenses of the business unit, are then placed into ROI formulae of present value, break-even analysis, internal rate of return and return on investment. Each of these was discussed from both the justification and the measurement perspectives.

Calculations of these measurements were demonstrated for data brokerage, fraud reduction and claims analysis examples. Students learned how to articulate and manage risk by using a probability distribution for their ROI estimates for their data warehouse justifications. Finally, rules of thumb for costing a data warehouse effort were given to help students in predicting the investment part of ROI.

Overarching themes of business partnership and governance were evident throughout as the students were duly warned to avoid the IT data warehouse and selling and justifying based on IT themes of technical elegance.

Monday, November 3: Evaluating Business Intelligence Toolsets (half-day course)

Wayne Eckerson, Director of Research, TDWI, and Cindi Howson, Independent Consultant, Analytic Solutions Know-How (ASK)

This course evaluated the BI Suite offerings of four leading BI vendors: Business Objects, Cognos, Crystal Decisions, and MicroStrategy. The instructors provided an apples-to-apples comparison of key functional areas among the tools: finances, strategy, architecture, reporting, query, OLAP, administration, and pricing. Given that the tools are from industry leaders, the similarities are greater than the differences. Most have a fairly comprehensive offering. Some like Business Objects and Cognos offer products outside of BI suites (e.g. ETL tools, analytic applications) while Crystal and MicroStrategy are focused strictly on the BI suite market. The instructors said they will broaden the coverage of products without sacrificing the detailed comparative research in future conferences.

Monday, November 3: From Data Warehousing to Information Integration (half-day course)

Barry Devlin, Distinguished Engineer, IBM Corporation

Most companies have already invested in data warehouses and business intelligence. But today, business needs are driving beyond what can be achieved easily with the traditional data warehouse architecture. The key drivers for change include: the increased need for near-real-time access to consolidated information, the rapid growth in the number and variety of information sources, both traditional and nontraditional, and the unending pressure for faster and better decision making.

This session described the evolving concept of information integration, which provides new opportunities to address these demands. This technology allows a more dynamic and federated view of the entire information infrastructure. However, a key point was that the data warehouse is, and will remain, a vital component for global keys as well as reconciled and historical data in this extended environment.

Key points included:

- The needs of decision makers today and how have they changed
- How the data warehouse has evolved to cope with these changes and where the gaps remain
- How information integration enables a data warehouse to support increasing needs for near-real-time information, as well as unstructured and semi-structured information
- The relationship between information integration, ETL, and meta data
- Examples of how information integration can be applied to current data warehousing issues

Monday, November 3: Hands-On ETL

Michael L. Gonzales, President, The Focus Group, Ltd.

In this full-day hands-on lab, Michael Gonzales and his team exposed the audience to a variety of ETL technologies and processes. Through lecture and hands-on exercises, students became familiar with a variety of ETL tools, such as those from Ascential Software, Microsoft, Informatica, and Sagent Technology.

In a case study, the students used three tools to extract, transform, and load raw source data into a target start schema. The goal was to expose students to the range of ETL technologies, and compare their major features and functions, such as data integration, cleansing, key assignments, and scalability.

Tuesday & Wednesday, November 4 & 5: TDWI Data Modeling Fundamentals, Parts I & II

Nancy Williams, Principal Consultant, DecisionPath Consulting

Data modeling techniques (Entity relationship modeling and Relational table schema design) were created to help analyze design and build OLTP applications. This excellent course demonstrated how to adapt and apply these techniques to data warehousing, along with demonstrating techniques (Fact/qualifier matrix modeling, Logical dimensional modeling, and Star/snowflake schema design) created specifically for analyzing and designing data warehousing environments. In addition, the techniques were placed in the context of developing a data warehousing environment so that the integration between the techniques could also be demonstrated.

The course showed how to model the data warehousing environment at all necessary levels of abstraction. It started with how to identify and model requirements at the conceptual level. Then it went on to show how to model the logical, structural, and physical designs. It stressed the necessity of these levels, so that there is a complete traceability of requirements to what is implemented in the data warehousing environment.

Most data warehousing environments are architected in two or three tiers. This course showed how to model the environment based on a three tier approach: the staging area for bringing in atomic data and storing long term history, the data warehouse for setting up and storing the data that will be distributed out to dependent data marts, and the data marts for user access to the data. Each tier has its own special role in the data warehousing environment, and each, therefore, has unique modeling requirements. The course demonstrated the modeling necessary for each of these tiers.

Tuesday, November 4: Data Warehousing Step by Step

Karolyn Duncan, Principal Consultant, Information Strategies, Inc., and TDWI Fellow

This course offered a step-wise guide to warehouse development highlighting what deliverables should be considered when implementing a warehousing environment. One of the many things learned in the first generation of data warehousing is the circular, iterative development approach. While this material was presented in a linear manner, the execution is anything but. This class showed the warehousing practitioner an easy to follow approach for creating a successful warehousing system.

For continuity, this material related to terminology used in TDWI owned courses.

This course could easily be understood both business people and technologists. Several crucial messages were communicated, including:

- A data warehouse is something you do, not something you buy. Technology plays a key role in helping practitioners construct warehouses, but without a full understanding of the methods and techniques, success would be a mere fluke.
- Program planning is an essential ingredient in warehousing success. This hybrid methodology is based on top-down methods and highlighted key architecture deliverables needed.
- Iterative development is a requirement. This approach demonstrated a clean release execution involving many repeated steps allowing the developer to hone in on the best end result.
- When developing a warehousing environment, no amount of analysis will yield what the live, production, raw data produces. This methodology has a unique exploration phase for working hands-on with production data as part of the release effort.

While the basics of warehousing definitions were not covered, this course provided an excellent overview for data warehousing professionals just starting out, as well as a good refresher course for veterans.

Tuesday, November 4: One Thing at a Time—An Evolutionary Approach to Meta Data Management

David R. Gleason, Senior Vice President, Intelligent Solutions, Inc.

Attendees came to this session to learn about and discuss a practical approach to dealing with the challenges of implementing meta data management in support of a data warehousing initiative. The instructor for the course was David Gleason, a consultant with Intelligent Solutions, Inc. David has spent over 14 years in information management, including positions at large data warehousing and meta data management software vendors.

First, the group learned about the rich variety of meta data that can exist in a data warehouse environment. They discussed the role that meta data plays in enabling and supporting the key functions of a corporate information factory. They learned specifically how meta data was useful to the data warehouse team, as well as to business users who interact with the data warehouse. They also learned about the importance of administrative, or “execution,” meta data in enabling the ongoing support and maintenance of the data warehouse.

Next, the group turned its attention to the components of a meta data strategy. This strategy serves as the blueprint for a meta data implementation, and is a necessary starting point for any organization that wants to roll out meta data management or extend its meta data management capabilities. The discussion covered key aspects of a meta data management strategy, including guiding principles, business-focused objectives,

governance, data stewardship, and meta data architecture. Special attention was paid to meta data architecture, including the introduction of a meta data mart. The meta data mart is a collection point for integrated meta data, and can be used to meet meta data needs when a full physical meta data repository is not desirable or required. Finally, the group examined some of the factors that may indicate that a company is ready to purchase a commercial meta data repository. This discussion included some of the criteria that companies should consider when they evaluate repository products.

Attendees left the session with key lessons including:

- Meta data management requires a well-defined set of business processes to control the creation, maintenance and sharing of meta data.
- Applying technology to meta data management does not alleviate the need to have a well-defined set of business processes. In many cases, the introduction of new meta data technology distracts organizations from the fundamental business processes, and leads to the collapse of their meta data efforts.
- A comprehensive meta data strategy is a requirement for a successful meta data management program. This strategy must address business and organizational issues in addition to technical ones.
- Successful meta data management efforts deliver new capabilities in relatively small, business objective-focused increments. Approaching meta data management with an enterprise approach significantly heightens the risk of failure.

A pragmatic, incremental meta data architecture starts with the introduction of meta data management processes and procedures, and manages meta data in-place, rather than moving immediately to a centralized physical meta data repository. The architecture can then grow to include a meta data mart, in which select meta data is replicated and integrated in order to support more comprehensive meta data analysis. Migration to a single physical meta data repository can be undertaken once meta data processes and procedures are well defined and implemented.

Tuesday, November 4: Collecting and Structuring Business Requirements for Enterprise Models

James A. Schardt, Chief Technologist, Advanced Concepts Center, LLC

This course focused on how to get the right requirements so that developers can use them to design and build a decision support system. The course offered very detailed, practical concepts and techniques for bridging the gap that often exists between developers and decision makers. The presentation showed proven, practiced requirement gathering techniques that capture the language of the decision maker and turn it into a form that helps the developer. Attendees seemed to appreciate the level of detail in both the lecture and the exercises, which held students' attention and offered value well beyond the instruction period.

Topics covered:

- Risk mitigation strategies for gathering requirements for the data warehouse
- A modeling framework for organizing your requirements
- Two data warehouse unique modeling patterns
- Techniques for mapping modeled requirements to data warehouse design

Tuesday, November 4: Leading and Organizing Data Warehousing Teams

Maureen Clarry and Kelly Gilmore, Partners, CONNECT: The Knowledge Network

This popular course provided a framework with which to create, oversee, participate in, and/or be the "customer" of a team engaged in a data warehousing effort. The course offered several valuable organizational quality tools which may be novel to some, but which are proven in successful enterprises:

- “Systems Thinking” as a general paradigm for avoiding relationship “traps” and overcoming obstacles to success in team efforts.
- “Mental Models” to help see and understand situations more clearly.
- Assessment tools to help anyone understand their own personal motives, drivers, needs, modes of learning and interaction; and those of their colleagues and customers.
- Strategies for enhancing collaboration, teamwork, and shared value.
- Leadership skills.
- Toolkits for defining and setting expectations for roles and responsibilities, and managing toward those expectations.

The subject matter in this course was not technical in nature, but it was designed to be deployed and used by team members engaged in complex data warehousing projects, to help them set objectives and manage collective pursuits toward achieving them.

Clarry and Gilmore used a highly interactive teaching style intended to engage all students and provide an atmosphere that stimulated learning.

Tuesday, November 4: Hands-On OLAP

Michael Gonzales, President, The Focus Group, Ltd.

Through lecture and hands-on lab, Michael Gonzales and his team exposed the audience to a variety of OLAP concepts and technologies. During the lab exercises, students became familiar with various OLAP products, such as Microsoft Analysis Services, Cognos PowerPlay, MicroStrategy, and IBM DB2 OLAP Essbase). The lab and lecture enabled students to compare features and functions of leading OLAP players and gain a better sense of how to use a multidimensional tool to build analytical applications and reports.

Wednesday, November 5: Data Warehouse Lifecycle Overview

Margy Ross, President, The Ralph Kimball Group, and Warren Thornthwaite, Founding Partner, InfoDynamics LLC

Co-authors of the best-selling book, *The Data Warehouse Lifecycle Toolkit* (Kimball, Reeves, Ross, and Thornthwaite), and the second edition of *The Data Warehouse Toolkit* (Kimball and Ross) distilled the essential elements into their introductory one-day program. The course began with an overview of the lifecycle and the requirements gathering process—since business requirements should be the foundation of every data warehouse. The next section covered the basic concepts of dimensional modeling. Then, the instructors used the second half of the course to demystify data warehouse architecture by focusing on the fundamentals: What goes into the architecture, and how do we actually create an architecture that will satisfy the business requirements? They then explored the data staging process to address basic questions around the extract, transform, and load process in the context of building a dimensional data warehouse. The course offered an overview of the lifecycle approach combined with practical tips and techniques for creating a successful data warehouse.

Participants Learned:

- Proven approach to successfully build a data warehouse
- Best practice techniques for handling crucial tasks
- Methods to address common pitfalls and gotchas

Wednesday, November 5: Meta Data Strategies for Large Corporations (half-day course)

Tom Gransee, Senior Principal, Knightsbridge Solutions LLC

Meta data solutions for large corporations continue to be a daunting task. From funding the project, to building your approach, to tool selection, meta data initiatives are relatively complex with no complete out-of-the-box solutions available. Gransee addressed these issues by providing a framework for defining and implementing practical meta data solutions within your organization. In addition, he will offered strategies upon which to build meta data successes and review the progress of meta data industry standards and repository tools and their impact on projects.

A case study approach was used to demonstrate how to establish meta data objectives that deliver true business benefits. An implantation plan was presented to identify typical resources requirements and timelines to deploy a repository solution. A clear ROI was demonstrated base detailed costs and benefits spreadsheets. Soft benefits were also examined along with a discussion of how they could be further quantified.

Key topics included:

- How to use a formalized approach for developing a meta data strategy
- How to define a practical strategy
- How to develop a supporting meta data architecture
- How to demonstrate ROI
- How to evaluate and select a meta data repository tool
- How to build and implement a solution

Wednesday, November 5: Analytical Applications: What Are They, and Why Should You Care? (half-day course)

Bill Schmarzo, Vice President Analytic Applications, DecisionWorks Consulting Inc.

Analytic Applications are the new “toast of the town” for the data warehouse and business intelligence community. Analytic applications hold the promise and potential to deliver quantifiable business benefits to companies who have already made significant investments in their data warehouse infrastructure.

The key to a successful analytic application implementation is gaining a clear understanding of the specific business problems or needs it is designed to address. The course shares practical techniques for not only how to identify those business problems, but also how to drive organizational alignment between the IT and business communities in the process.

Since analytic applications are most likely a “buy and build” proposition, the course outlines the key functional criteria typically required of an analytic application. This includes domain knowledge, an interactive exploration environment, collaboration (to support organizational sharing), a data warehouse foundation with strong meta data management capabilities, and a ubiquitous and pervasive business community environment. The “packaged data warehouse” also plays a role in this decision and is discussed accordingly in the course.

Finally, the course concludes by helping the attendees understand the analytic application lifecycle. The goal of the analytic application lifecycle is to move the data warehouse and analytic environment beyond a “bucket of reports.” The lifecycle proactively moves the business community to the next stages of analytics beyond publishing reports, including exception identification, causal factor determination, modeling alternatives, and tracking actions. Each of these stages has direct impact upon the data warehouse design, especially as the organization uses the data warehouse to capture the intellectual capital that is a by-product of the analytic application lifecycle.

Wednesday, November 5: Integrating Data Warehouses and Data Marts Using Conformed Dimensions (half-day course)

Laura Reeves, Principal, StarSoft Solutions, Inc.

The concepts of developing data warehouses and data marts from a top-down and bottom-up approach were discussed. This informative discussion assisted students to better assimilate information about data warehousing by comparing and contrasting two different views of the industry.

Going back to basics, we covered the reasons why you may or may not want to integrate data across your enterprise. It is critical to determine if the business community has recognized the business need for data integration or if this is only understood by a small number of systems professionals.

The ability to integrate data marts across your enterprise is based on conformed dimensions. Much of the morning was spent understanding the characteristics of conformed dimensions and how to design them. This concept provides the foundation for your enterprise data warehouse data architecture.

While it would be great to start with a fresh slate, many organizations already have multiple data marts that do not integrate today. We discussed techniques to assess the current state of data warehousing and then how to develop an enterprise integration strategy. Once the strategy is set, the work to retrofit the data marts begins.

There were hands on interactive exercises both in the morning and afternoon that helped get the class interacting with each other and ensured that the concepts were really understood by the students.

The session finished with several practical suggestions about how to understand and get things moving once you were back at work. Reeves continued to emphasize a central theme—all your work and decisions must be driven by and understanding of the business users and their needs. By keeping the users in the forefront of your thoughts, your likelihood to succeed increases dramatically!

Wednesday, November 5: How to Build a Data Warehouse with Limited Resources (half-day course)

Claudia Imhoff, President, Intelligent Solutions, Inc.

Companies often need to implement a data warehouse with limited resources, but this does not alleviate the needs for a planned architecture. These companies need a defined architecture to understand where they are and where they're headed so that they can chart a course for meeting their objectives. Sponsorship is crucial. Committed, active business sponsors help to focus the effort and sustain the momentum. IT sponsorship helps to gain the needed resources and promote the adopted (abbreviated) methodology.

Ms. Imhoff reviewed some key things to watch out for in terms of sponsorship commitment and support. Scope definition and containment are critical. With a limited budget, it's extremely important to carefully delineate the scope and to explicitly state what won't be delivered to avoid future disappointments. The infrastructure needs to be scalable, but companies can start small. There may be excess capacity on existing servers; there may be unused software licenses for some of the needed products. To acquire equipment, consider leasing and buying equipment from companies that are going out of business at a low cost.

Some tips for reducing costs are:

- Ensure active participation by the sponsors and business representatives.
- Carefully define the scope of the project and reasonably resist changes—scope changes often add to the project cost, particularly if they are not well managed.
- Approach the effort as a program, with details being restricted to the first iteration's needs.
- Time-box the scope, deliverables, and resource commitments.
- Transfer responsibility for data quality to people responsible for the operational systems.
- When looking at ETL tools, consider less expensive ones with reduced capabilities.
- Establish realistic quality expectations—do not expect perfect data, mostly because of source system limitations.

- The architecture is a conceptual view. Initially, the components can be placed on a single platform, but with the architectural view, they can be structured to facilitate subsequent segregation onto separate platforms to accommodate growth.
- Search for available capacity and software products that may be in-house already. For example, MS-Access may already be installed and could be used for the initial deliverable.

Ensure that the team members understand their roles and have the appropriate skills. Be resourceful in getting participation from people not directly assigned to the team.

Wednesday, November 5: Unique Challenges in Higher Education (half-day course)

Dave Wells, Director of Education, TDWI

This very interactive session discussed the many challenges in data warehousing that are unique to Higher Education institutions. Using input from an online discussion forum (www.dw-institute.com/forum) several common themes emerged. Among the top areas of challenge the group identified:

- **Enterprise Orientation**—Higher education institutions aren't typically engaged in a single enterprise. They frequently engage in multiple enterprises—education, public service, research, healthcare, etc. Enterprise-oriented approaches are particularly difficult to apply in university settings.
- **Modeling and Standards**—Many other industries (finance, telecommunications, insurance, etc.) have standard process and data models. Such models don't exist for higher education, making it difficult for data warehousing teams to find a starting place.
- **Political Climate**—Higher education institutions are highly political environments, made more so by universal tensions between competing academic and administrative computing needs. Political conflicts create sponsorship and funding issues that are difficult to resolve, and they add complexity to priority setting and decision making.
- **Technical Challenges**—Most institutions have little control over desktop platforms. Windows, Linux, UNIX, Macintosh, and a variety of other desktop operating systems are common. Well-funded departments have modern equipment, and those without money may operate with inadequate hardware and obsolete software versions. Mainframe infrastructure often includes "homegrown" components such as teleprocessing systems, database management systems, and security software. Commercially available data warehousing tools are difficult to integrate into these environments.
- **Staffing and Skills Challenges**—Higher education organizations seldom have knowledgeable and experienced data warehousing teams. Budget and salary constraints make it difficult to bring experienced people on board and to retain existing staff once they gain experience.
- **Data Governance Challenges**—Related to the challenges of enterprise orientation and political climate, it is difficult to gain consensus about data management, and even more difficult to establish data standards and achieve compliance with those standards.

Those attending this session discussed these challenges and shared their individual experiences and ideas about how to meet the challenges. The session concluded with enthusiasm to continue working together as a higher education special interest group (SIG) and to continue sharing issues, solutions, and best practices. Although the formal session ended at mid-day on Wednesday, many attendees continued to meet informally throughout the week. On Thursday evening they met in a peer-networking session where the formally established an ongoing higher education SIG.

Wednesday, November 5: Getting the “Big Picture” in Higher Education: Enterprise and Subject Models (half-day course)

Steve Hoberman, Global Reference Data Expert, Mars, Inc.

Higher education institutions are complex organizations where the prospect of creating integrated BI solutions may be daunting. One key to managing the complexity is an enterprise subject area model—a map to all of the key concepts within the organization and a tool to distinguish source applications, highlight integration issues, and define key terms. A subject model allows you to confidently plot the course of BI applications. This interactive session explained enterprise subject area modeling within a university setting and offered participants practice designing and interpreting such a model.

Attendees Learned:

- What an enterprise subject area model is and its value within your university
- The ideal level of granularity for your particular needs
- How to tell the story within such a model
- How to build an enterprise model based on a starter model that we provide

Wednesday, November 5: Integrating Business Intelligence into the Enterprise

Colin White, President, BI Research

Organizations are making increasing use of business intelligence (BI) systems to improve business performance and reduce costs. BI systems are no longer nice to have, but essential to business success. These systems are now being used not only for strategic planning, but also for driving day-to-day business operations. To meet the need for more advanced BI capabilities, vendors in many different parts of the IT industry are rapidly improving the technology and facilities provided in their products. To maximize the benefits of business intelligence, it is important for organizations to understand BI marketplace directions, and to match BI products to the skills, requirements, and roles of business users. Given the vast array of BI technologies, vendors, and products available today, these are not easy tasks. This course looked at the current state of the art in data warehousing and business intelligence, reviewed industry trends, and discussed how organizations are taking advantage of new BI technologies to drive and improve business operations. It also presented a framework that enables participants to develop a BI strategy for their organizations.

Attendees Learned:

- The state of the art in data warehousing and BI
- The role and benefits of different types of BI
- How to use business performance management to manage the business
- How to drive business operations using real-time BI processing
- How to build an integrated BI architecture

Wednesday, August 20: Hands-On Data Mining

Michael L. Gonzales, President, The Focus Group Ltd.

Hands-On Data Mining is committed to providing a non-biased lecture on best-of-class technologies and techniques as well as exposing participants to leading data mining tools, their use, and their application, including SAS Enterprise Miner, IBM OLAP Miner, Teradata Warehouse Miner, and Microsoft Analytics.

The course encompassed a mix of lecture and formal lab exercises. The lecture components included an overview of data mining, the fundamental uses of the technology, and how to effectively blend that technology into your overall BI environment.

Formal lab exercises were conducted between lecture components in order to provide participants an opportunity to experience the fundamental features of leading data mining tools. Lab exercises were conducted for different mining tools. These labs are designed to allow participants to compare how each tool generally functions, its best features, and how well it integrates with your warehouse and BI solution.

Attendees learned:

- How to establish data mining as a natural component of the DW effort and BI solutions
- Why and when to implement data mining applications
- How to recognize data mining opportunities
- Technology/techniques that must be considered for effective data mining
- Through extensive lab exercises, you will gain hands-on experience with leading data mining tools

Thursday & Friday, November 6 & 7: TDWI Data Integration Fundamentals, Parts I & II

Jim Thomann, Principal Consultant, DecisionPath Consulting, and TDWI Fellow

The first part of this class provided both a conceptual and practical understanding of data cleansing techniques. With a focus on quality principles and a strong foundation of business rules, the class described a structured approach to data cleansing. Eighteen categories of data quality defects—11 for data correctness and 7 for data integrity—were described, with defect testing and measurement techniques described for each category. When combined with four kinds of data cleansing actions—auditing, filtering, correction, and prevention—this structure offers a robust set of 72 actions that may be taken to cleanse data!

But a comprehensive menu of cleansing actions isn't enough to provide a complete data cleansing strategy. From a practitioner's perspective, the class described the activities necessary to:

- Develop data profiles and identify data with high defect rates
- Use data profiles to discover "hidden" data quality rules
- Meet the challenges of data de-duplication and data consolidation
- Choose between cleansing source data and cleansing warehousing data
- Set the scope of data cleansing activities
- Develop a plan for incremental improvement of data quality
- Measure effectiveness of data cleansing activities
- Establish an ongoing data quality program

From a technology perspective, the class briefly described several categories of data cleansing tools. The instructor cautioned, however, that tools don't cleanse data. People cleanse data and tools may help them to do that job. This class provided an in-depth look at data cleansing with attention to both business and technical roles and responsibilities. The instructor offered practical, experience-based guidance in both the "art" and the "science" of improving data quality.

The second part of this fundamentals course focused on the challenges of acquiring data for the data warehouse. The instructors stressed that data acquisition typically accounts for 60–70 percent of the total effort of warehouse development. The course covered considerations for data capture, data transformation, and database loading. It also offered a brief overview of technologies that play a role in data acquisition. Key messages from the course include:

- Source data assessment and modeling is the first step of data acquisition. Understanding source data is an essential step before you can effectively design data extract, transform, and load processes.
- Don't be too quick to assume that the right data sources are obvious. Consider a variety of sources to enhance robustness of the data warehouse.
- First map target data to sources, then define the steps of data transformation.

- Expect many extract, transform, and load (ETL) sequences – for historical data as well as ongoing refresh, for intake of data from original sources, for migration of data from staging to the warehouse, and for populating of data marts.

Detecting data changes, cleansing data, choosing among push and pull methods, and managing large volumes of data are some of the common data acquisition challenges.

Thursday, November 6: Six Steps to a Successful Corporate Information Factory

Claudia Imhoff, President, Intelligent Solutions, Inc. and Jonathan G. Geiger, Executive Vice President, Intelligent Solutions, Inc.

Sustainable data warehouses and data marts don't just happen. Building an environment that portrays the enterprise perspective of data requires a predictable and repeatable process with defined roles and responsibilities. This session described a methodology for building and managing the Corporate Information Factory, which includes both a data warehouse and a set of data marts. The six-step methodology starts with program-oriented activities to enable incremental development while maintaining the long-term picture in mind. This ensures that developers "think globally but build locally." The next four steps deal with project-specific activities. These steps address the initiation and planning activities, activities aimed at getting data in, those aimed at getting information out to the using community, and deployment activities. Deployment is not the final step though—after deployment, the team must ensure that the Corporate Information Factory continues to provide ever-increasing business value. This is addressed by the sixth step, which encompasses operation and administration activities.

Attendees learned:

- Methodology for developing a successful Corporate Information Factory
- Roles and responsibilities for the implementation team
- Project planning activities and resource estimate considerations

Thursday, November 6: Data Mining: The Key to Data Warehouse Value

Herb Edelstein, President, Two Crows Corp.

In his own inimitable style, Herb Edelstein demystified data mining for the uninitiated. He made five key points:

1. Data mining is not about algorithms, it's about the data. People who are successful with data mining understand the business implications of the data, know how to clean and transform it, and are willing to explore the data to come up with the best variables to analyze out of potentially thousands. For example, "age" and "income" may be good predictors, but the "age-to-income ratio" may be the best predictor, although this variable doesn't exist natively in the data.
2. Data mining is not OLAP. Data mining is about making predictions, not navigating the data using queries and OLAP tools.
3. You don't have to be a statistician to master data mining tools and be a good data miner. You also don't have to have a data warehouse in place to start data mining.
4. Some of the most serious barriers to success with data mining are organizational, not technological. Your company needs to have a commitment to incremental improvement using data mining tools. Despite what some vendor salespeople say, data mining is not about throwing tools against data to discover nuggets of gold. It's about making consistently better predictions over time.

5. Data mining tools today are significantly improved over those that existed two to three years ago.

Thursday, November 6: Dimensional Modeling Beyond the Basics: Intermediate and Advanced Techniques

Laura Reeves, Principal, StarSoft Solutions, Inc.

The day started with a brief overview of how terminology is used in diverse ways from different perspectives in the data warehousing industry. This discussion is aimed at aiding the students to better understand industry terminology and positioning.

The day progressed with a variety of specific data modeling issues discussed. Examples of these techniques were provided along with modeling options. Some of the topics covered include dimensional role-playing, date and time related issues, complex hierarchies, and handling many-to-many relationships.

Several exercises gave students the opportunity to reinforce the concepts and to encourage discussion amongst students.

Reeves also shared a modeling technique to create a technology independent design. This dimensional model then can be translated into table structures that accommodate design recommendations from your data access tool vendor. This process provides the ability to separate the business viewpoint from the nuance and quirks of data modeling to ensure that the data access tools can deliver the promised functionality with the best performance possible.

Thursday, November 6: Managing the Data Warehouse Infrastructure for Growth and Change

John O'Brien, Principal Architect, Level 3 Communications, Inc.

John started off with an introduction that may be a little longer than most, but his passion for the importance of managing the DW infrastructure for the success of DW programs comes from his extended implementation experiences on DW implementations. He has seen first hand that the best DW intentions, designs, models, tools, teams, ETL, etc, are for naught if the management of the infrastructure is left behind. You'll find that DW success stories are closely tied to their reputation for both value and dependability. It is a DW team's responsibility to manage this dependability for their customers. This course is designed to arm attendees with that knowledge to manage their infrastructure and work with other supporting organizations where necessary to take care of their customers.

The course covered the usual four key topics around infrastructure management simply with more real-world examples than previous conferences.

1. DW Administration
2. Performance and Capacity Management
3. Storage Architectures
4. DW Operations

John actively encourages questions and discussion around the attendees' experiences for the class to share. In the New Orleans class, we spent extra time to discuss DW administration as it relates to SLA management and Change Controls. Additionally, extra time was spent discussing Storage Architectures and for both detail technical implementation and extending storage efficiently with HSM and Nearline solutions to increase ongoing DW ROI. It always seems to vary conference to conference but this is a good sign that the course is adapting to everyone's needs.

Thursday, November 6: Managing a Business Intelligence Program

Donna Corrigan, Director—Business Intelligence, CoBank

Data warehouses are implemented in an iterative manner under the umbrella of a business intelligence program. Program management is different from project management; it is the processes and activities that ensure the long-term health of the data warehouse over time. This session described specific program activities from the perspective of the program manager. The information can be used as a guide to start up a business intelligence program or as a checklist to audit an existing program.

The agenda included a discussion of general concepts, including the differences between programs and projects, and the differences between business intelligence programs and traditional IT applications.

Detailed information was covered around setting a BI program vision, defining objectives, and reviewing a process for interviewing program executives and stakeholders. In the area of communications, a communication plan was discussed, including how to interact with a steering committee and Subject Matter Experts. People management issues specific to a BI staff were also discussed.

Finally, guidelines were provided for program processes to maintain data warehouse implementations, including release management and change control and project close-out activities.

Thursday, Nov. 6: Advanced Techniques for Data Warehouse and Business Intelligence Project Managers

Bobbie Mecalo, Senior Project Manager, Great West Healthcare

This course was designed for program and project managers as well as technologists. Each topic represented a different and necessary element of project success. This course incorporated key principles and best practices from the Project Management Institute and The Data Warehouse Institute. The instructor highlighted the most important aspects of project management related to Data Warehousing and Business Intelligence. She covered the deliverables, processes and knowledge areas crucial to leading a successful project. Important topics covered were:

- Describing as well as defining deliverables specific to a data warehouse or business intelligence project is important. Many team members may be new to data warehousing and not understand differences when recording requirements, developing processes and modeling data.
- Creating a work breakdown structure that is specific to data warehousing (use a spiral method vs waterfall) and with a minimum of dependencies will improve the usability of the project plan.
- Architecture choices based on business needs influence the project plan and scope. Matching the architecture to the business need is crucial (Data Warehouse vs ODS vs Data Mart).
- Defining the architecture drivers early in the project will provide valuable information concerning the data management processes that will be in the project scope.
- Quality management of data is the single most important aspect of the data warehouse and business intelligence environments. Plan to spend a lot of project time in this area working jointly with business users.

The processes and deliverables for a project manager of a data warehouse project are standard project management documents. The project manager needs to understand data warehousing and business intelligence in order to guide the team in the development of the important technical documentation. This course gives an excellent overview of the things project managers should look for and incorporate into their plans.

Thursday, November 6: Hands-On Business Intelligence: The Next Wave

Michael L. Gonzales, President, The Focus Group Ltd.

In this full-day hands-on lab, Michael Gonzales and his team exposed the audience to a variety of business intelligence technologies. The goal was to show that business intelligence is more than just ETL and OLAP tools; it is a learning organization that uses a variety of tools and processes to glean insight from information.

In this lab, students walked through a data mining tool, a spatial analysis tool, and a portal. Through lecture, hands-on exercises, and group discussion, the students discovered the importance of designing a data warehousing architecture with end technologies in mind. For example, companies that want to analyze data using maps or geographic information need to realize that geocoding requires atomic-level data. More importantly, the students realized how and when to apply business intelligence technology to enhance information content and analyses.

Friday, November 7: Business Rules for Data Quality Validation (half-day course)

David Loshin, President, Knowledge Integrity, Inc.

In this course, the attendee is introduced to a new approach to measuring and improving data quality through the rule-based approach. First, Loshin demonstrates the importance of the issue of data quality in the data warehousing environment. He also reminds students that despite what data cleansing software vendors will tell you, there are no true objective measures of data quality, as data quality is dependent on context.

Therefore, it is up to the practitioner, in partnership with the business client, to identify the key data quality requirements and come up with a way to measure conformance with these expectations. In the rule-based approach, business client expectations are evaluated based on business need, historical data use, integration parameters, and data profiling. The resulting statements can then be transformed into a formal definition based on a hierarchical view of how information is used.

Rules based on that hierarchy, which builds from the value level, through the binding of values to attributes, sets of attributes within records, records within tables, and the confluence of multiple tables, can be transformed into measurement objects (such as programs that extract and count violating records using embedded SQL). The combination of these measurement objects can be used both as a filter to distinguish between conforming data and non-conforming data, as well as a driver for measuring and monitoring the ongoing levels of data quality. As these objects are integrated into the pre- and post-ETL process, nonconformant records may be augmented with the rules that they violate, providing a mechanism for aggregating data for reconciliation by violation, and later for evaluation of problems in the data creation or integration process.

The most significant issue raised during the class involved the problem of data boundaries: what does one do when the non-conformant data sets lie outside the data warehouse control, and what can be done with respect to forcing the supplier to enforce data quality constraints? Of course, when one supplier improves data, all consumers of that data receive a benefit, but an area for future discussion will incorporate some of the organizational issues of data quality improvement, especially with respect to source systems. Another issue raised involved the level of detail for data quality monitoring—do we look at the micro level with SQL queries, or can we integrate that mechanism up to an application level; this is another area for future modifications to the course. Lastly, in the area of business intelligence and information rule compliance, there is a fine line between a data quality rule and a general business rule; this topic sparked some interest, and we may build on this issue in the future.

Friday, November 7: Data Modeling Workshop

Steve Hoberman, Global Reference Data Expert, Mars, Inc.

For those “die-hard” data warehouse and data modeling practitioners, the Data Modeling Workshop was a great way to end the week. Many of the attendees commented that the workshop challenged what they learned during the week and allowed them to practice and therefore reinforce what they had learned. This was a team workshop where groups of three and four completed a series of data modeling deliverables for the fictitious company, Consumer Interaction, Inc. This workshop contained minimal lecture, with a majority of the time spent analyzing and designing. Participants played the roles of analysts and modelers, and the instructor initially played the role of lecturer and then during the actual workshop played the roles of design advisor and business user. There was a minimum set of deliverables each team was expected to complete including the data mart logical and physical data models. There were also a number of “extra credit” deliverables around topics such as complex hierarchies and history.

The day was extremely interactive, with teams taking different approaches on the workshop material, based on the backgrounds and experiences of the team members. For example, all four members on one of the teams took the same TDWI course earlier in the week and consistently applied techniques from this course. Another team had very diverse backgrounds: one member was a data modeler, another a database administrator, another a report writer, and the fourth an ETL (extract, transform, and load) developer. You can imagine the lively debates on this team! At the end of the workshop Mr. Hoberman provided recommendations and reviewed the key observations from each of the teams.

Friday, November 7: The Operational Data Store in Action

Joyce Norris-Montanari, Senior Vice President, Intelligent Solutions, Inc.

Key Points of the Course

This course took the theory of the Operational Data Store one step further. The course addressed advanced issues that surrounds the implementation of an ODS. It began with an understanding of what an Operational Data Store is (and *is not*) and how it fits into an architected environment. Differences between the ODS and the Data Warehouse were discussed. Many students in the class realized that what they had built (thinking it was a data warehouse) was really an ODS.

Best practices for implementation were discussed, as well as resource and methodology requirements. While methodology may not be considered fun, by some, it is considered necessary to successfully implement an ODS. A data model example was used to drive home the differences in the ODS and data warehouse. The session wrapped up with a discussion on how important the quality of the data is in the ODS (especially in a customer centric environment) and how to successfully revamp an environment based on past mistakes and the sudden realization that what was created was not a data warehouse but an ODS.

What Was Learned in This Course

The student left this session understanding the:

1. Architectural Differences Between the ODS and the Data Warehouse
2. Classes of the Operational Data Store
3. ODS Interfaces—What Comes in and What Goes Out!
4. ODS Distinctions

Best Practices When Implementing an ODS in e-Business, Financial Institutions, Insurance Corporations and Research and Development Firms

Friday, November 7: Discovery-Driven Solutions: Automating Business Intelligence

Robert Ford, VP—Technology Services, PolyVista, Inc.

Bob Ford of PolyVista, Inc., presented an exciting new course offered by TDWI this fall. His topic proved to be very timely in demonstrating the real value of discovery-driven solutions, capping off an intense week of warehouse planning and implementation instruction.

The course began by clearly defining discovery solutions (DS), and explaining why they are important (the value) and how you can recognize a DS need within your organization. Included in the instruction were demonstrations of various shipping products that support and apply these unique new concepts.

While discovery solutions are geared toward helping a general class of business analysts find specific answers to their data-related questions, the unique element of DS is the ability to automate the process to discover new, previously unknown business insight driving new opportunities and competitive advantage. The key to the high value of DS lies in the ability to put this “power to discover” in the hands of business professionals, rather than limit these techniques to the super power users and Ph.D. statisticians. It is far more likely that an experienced business professional will be able to recognize an important new business relationship or opportunity than could a very capable mathematician with limited business experience.

To validate the value proposition, a case study was presented involving PolyVista and HP. Hewlett-Packard documented savings of over \$6 million attributed to the implementation of a discovery-driven warrantee & quality management system. Primary value drivers were significant improvements in the speed and quality of root cause analysis and discovery-driven early warning.

The products used to demonstrate DS concepts included Panorama’s NovaView, Microsoft’s Data Analyzer, MIS-AG’s Delta Miner and PolyVista’s Discovery client.

V. Business Intelligence Strategies Program----- *Emerging Trends, Techniques, and Technologies in Business Intelligence*

Presenters:

Wayne Eckerson
(Program Chair)
TDWI Director of Research

Richard Hackathorn
President,
Bolder Technology, Inc.

Deb Masdea
Director—Business
Information and Analysis,
The Scotts Company

Gregory McMillan
Enterprise Business Intelligence
and Data Warehousing Manager,
Ford Motor Company

Henry Morris
Group VP—Applications and
Information Access, IDC

Eric Rogge
VP and Research Director, Ventana
Research

Philip Russom
Giga Research Director,
Forrester Research,

Colin White
President, BI Research

Richard Winter
President, Winter
Corporation

“Emerging Trends and Technologies” was the theme of this quarter’s BI Strategies program, which attracts thought leaders and leading practitioners in the BI field to discuss their experiences and “lessons learned.”

The morning consisted of presentations surrounding real-time BI and fact-based decision making. Colin White, president of BI Research, reviewed the findings of a newly published study on real-time BI, highlighting definitions and architectural alternatives. Next, Henry Morris, a top analyst at IDC, revealed some very interesting data that show a

significantly higher ROI for BI projects that employ predictive analytics. Morris was followed by Deb Masdea, BI manager for The Scotts Company, who offered some practical steps for how to evangelize BI and drive the company to embrace timely fact-based decision making. Finally, Richard Hackathorn provided timely advice on how to use alerting to reduce the latency of decision making.

In the afternoon, we focused on technologies. Philip Russom of Forrester Group kicked off the session by surveying the landscape for Enterprise Information Integration tools. Next, Richard Winter provided insight into the techniques and strategies for managing and designing terabyte-plus databases in data warehousing applications. During the last section, Greg McMillan of Ford Motor Company discussed the importance of a BI competency center and Eric Rogge of Ventana Research revealed highlights from his recent TCO study of BI tools vendors.

The February 2004 program will focus on “Real-Time BI.” Don’t miss it!

VI. Evening Education -----

Throughout the week in San Diego, attendees had the opportunity to schedule free 30-minute, one-on-one consultations with a variety of course instructors. These “guru sessions” provided attendees time to obtain expert insight into their specific issues and challenges.

TDWI also sponsored networking sessions on a variety of topics including:

- Data Governance and Stewardship
- Healthcare Special Interest Group
- Data Quality
- Managing Change in the Data Warehouse
- Getting from Data Warehousing to Business Intelligence
- ROI and TCO
- Administration and Management of the Production Data Warehouse
- Higher Education Special Interest Group
- Practical Meta Data Strategies
- Program and Project Management

More than 200 attendees participated and the majority agreed that the networking sessions were a good use of their time. Comments typically overheard from the sessions included:

- "I enjoyed having the opportunity to talk with my peers -- I got new ideas I hadn't thought of"
- "These sessions give me the opportunity to discuss issues relevant to our specific industry"

- "Let's exchange business cards so we can continue our discussions after the conference"

If you have ideas for additional topics for future sessions, please contact Nancy Hanlon at nhanlon@dw-institute.com.

NIGHT SCHOOL COURSES

The following free courses were offered after regular courses, to promote networking among attendees and test new topics.

Sunday, November 2

- *Training Support and Customer Care in Data Warehousing*, J. Hay
- *Unstructured Data Analytics*, N. Mackay and R. Mohan

Monday, November 3

- *Business and IT Alignment with Agile Analytics*, D. Press
- *Strengthen the Data Warehouse Business Case by Accounting for and Addressing Uncertainty*, J. Doran

Wednesday, November 5

- *Building a Data Warehouse Strategy Document*, M. Gonzales
- *Data Warehousing at the University of Illinois*, A. Ballinger

VII. Vendor Exhibit Hall-----

By Diane Foults, TDWI Exhibits Manager

The following vendors exhibited at TDWI's World conference in San Diego, and showcased the following products:

DATA WAREHOUSE DESIGN

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Ascential Software	DataStage®XE, DataStage®XE/390, DataStage®XE Portal Edition
Business Objects	Data Integrator, Rapid Marts
Cognos Inc.	DecisionStream, Cognos Analytic Applications
Computer Associates	AllFusion Modeling Suite, AllFusion Saphir Option, Advantage Data Transformer
Embarcadero Technologies Inc.	Embarcadero ER/Studio
Informatica Corporation	Informatica PowerCenter, Informatica PowerCenterRT, Informatica PowerMart, Informatica Metadata Exchange
Microsoft	SQL Server 2000
MicroStrategy	MicroStrategy Architect, MicroStrategy BI Developer Kit
SAS	SAS ETL Studio, SAS Management Console
Teradata, a division of NCR	Teradata Professional Services

DATA INTEGRATION

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Applix	TM1, Turbo Integrator
Ascential Software	INTEGRITY™, INTEGRITY™ CASS, INTEGRITY™ DPID, INTEGRITY™ GeoLocator, INTEGRITY™ Real Time, INTEGRITY™ SERP, INTEGRITY™ WAVES, MetaRecon™, DataStage®XE, DataStage®XE/390, MetaRecon™ Connectivity for Enterprise Applications, DataStage®XE Parallel Extender
Brio Software	SQR™, Brio Metrics Builder
Business Objects	Data Integrator, Rapid Marts
Cognos	DecisionStream, Cognos Analytic Applications
Computer Associates	Advantage Data Transformer
DataFlux (A SAS Company)	DataFlux Data Management Solutions
DataMirror	Transformation Server™ (Real-time, multi-platform change data capture, transform and flow), DB/XML Transform™ (Database-to-XML transformation), Constellar Hub™ (Enterprise data warehouse integration and infrastructure), LiveAudit™ (Data monitoring, E-Records audit trails)
Embarcadero Technologies Inc.	Embarcadero DT/Studio
Firstlogic, Inc.	Information Quality Suite
Group 1/Sagent	DataSight, Data Flow
Hummingbird Ltd.	Hummingbird ETL™
IBM	DB2 Information Integrator
Informatica Corporation	Informatica PowerCenter, Informatica PowerCenterRT, Informatica PowerMart, Informatica PowerConnect (ERP, CRM, Real-time, Mainframe), Informatica PowerChannel (Remote Files, Remote Data), Informatica Metadata Exchange, Informatica Quality Option, Informatica SuperGlue (enterprise metadata management solution that links metadata from multiple systems)
Kalido	Dynamic Information Warehouse
Microsoft	SQL Server Data Transformation Services (DTS)
SAS	SAS ETL Studio, SAS Management Console, SAS Metadata Server, SAS Data Quality Server, SAS Data Surveyors
Trillium Software™	Trillium Software System® Version 7

INFRASTRUCTURE

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Actuate	Actuate 7 iServer
Applix	TM1
Business Objects	Data Integrator, Rapid Marts
Cognos	DecisionStream, Cognos Analytic Applications
Computer Associates	AllFusion Modeling Suite, AllFusion Saphir Option, Advantage Data Transformer, Unicenter Database Performance Management, Unicenter DBA, Unicenter EDBA
DataMirror	Constellar Hub
IBM	DB2 Universal Database - Data Warehouse Edition
Microsoft	SQL Server 2000
MicroStrategy	MicroStrategy Intelligence Server

Netezza	Netezza Performance Server™ System
Network Appliance	FAS Servers, NearStore™ nearline solutions and NetCache® content delivery appliances
SAS	SAS OLAP Server, SAS SPDS Server, SAS Integration Technologies
Teradata, a division of NCR	Teradata RDBMS
Unisys Corporation	ES7000 Enterprise Server

ADMINISTRATION AND OPERATIONS

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Actuate	Actuate 7 iServer
Brio Software	Brio Performance Suite™ 8, Designer
Business Objects	Data Integrator, Supervisor, Designer, Auditor
Computer Associates	Unicenter DBA, Unicenter EDDBA, Unicenter Database Analyzer, Unicenter Log Analyzer, Unicenter Database Performance Management, Unicenter SQL-Station, Unicenter TSreorg, and Unicenter Fast Unload
DataMirror	iCluster™ (IBM iSeries high availability), iReflect™ (high data availability and data distribution for Oracle)
Microsoft	SQL Server 2000
MicroStrategy	MicroStrategy Administrator, MicroStrategy Intelligence Server
Network Appliance	NetApp® Snapshot™, Snap Vault™ & SnapRestore® software
SAS	SAS Management Console

DATA ANALYSIS

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Actuate	Actuate 7
Applix	TMI
Brio Software	Intelligence iServer, Designer, Explorer, Insight Server, Brio Metrics Builder, Reports iServer
Business Objects	WebIntelligence, InfoView, Business Query
Cognos	Cognos Series 7, Cognos Metrics Manager
Computer Associates	Advantage Data Transformer, CleverPath Aion Business Rules Expert
DataFlux (A SAS Company)	DataFlux Data Management Solutions
Group 1 Software	Data Quality Assessment
Hummingbird Ltd.	Hummingbird BI™
IBM	DB2 Cube Views
Informatica Corporation	Informatica PowerAnalyzer, Informatica Mobile
Microsoft	SQL Server 2000 Analysis Services (OLAP, DM)
MicroStrategy	MicroStrategy Desktop, MicroStrategy Web, MicroStrategy MDX Adapter, MicroStrategy 7i OLAP Services
Netezza	Netezza Performance Server™ System
SAS	SAS Enterprise Guide®, SAS Enterprise Miner™, SAS Text Miner, SAS/STAT®, SAS/ETS®, SAS/OR®, SAS/QC®
Teradata, a division of NCR	Teradata Warehouse Miner

INFORMATION DELIVERY

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Actuate	Actuate 7
Applix	TM1, Integra
Brio Software	Intelligence iServer, Reports iServer
Business Objects	InfoView, InfoView Mobile, Broadcast Agent
Cognos	Cognos Series 7
Computer Associates	CleverPath Portal
Hummingbird Ltd.	Hummingbird Portal™, Hummingbird DM/Web Publishing™, Hummingbird DM™, Hummingbird Collaboration™
Informatica Corporation	Informatica PowerAnalyzer, Informatica Mobile, Informatica SuperGlue
Microsoft	SQL Server Reporting Services, Microsoft Office 2003, SharePoint Portal Server, Data Analyzer
MicroStrategy	MicroStrategy Narrowcast Server
SAS	SAS BI Server, SAS Information Delivery Portal, SAS/IntrNet

ANALYTIC APPLICATIONS AND DEVELOPMENT TOOLS

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Applix	TM1, Integra, Turbo Integrator
Brio Software	Brio Metrics Builder™, Designer, Explorer, SQR Developer
Business Objects	Application Foundation, Customer Intelligence, Product and Service Intelligence, Operations Intelligence, Supply Chain Intelligence, Data Integrator, Rapid Marts
Cognos	Cognos Analytic Applications (Supply Chain Analytics, Customer Analytics, Financial/Operational Analytics)
Computer Associates	AllFusion Modeling Suite, AllFusion Saphir Option, Advantage Data Transformer
Embarcadero Technologies Inc.	Embarcadero Describe
IBM	IBM Healthcare Information on demand
Informatica Corporation	Informatica PowerAnalyzer, Informatica Mobile
Microsoft	SQL Server Accelerator for BI, Visual Studio.net
MicroStrategy	MicroStrategy BI Developer Kit, Microstrategy Analytic Modules -- Customer Analysis -- Financial Reporting Analysis -- HR Analysis -- Sales Force Analysis -- Sales & Distribution Analysis -- Web Traffic Analysis MicroStrategy Software Development Kit, MicroStrategy Transactor, MicroStrategy Architect
ProClarity Corporation	ProClarity Enterprise Server/Desktop Client
SAS	SAS High-Performance Forecasting, SAS Enterprise Miner™, SAS AppDev Studio™

BUSINESS INTELLIGENCE SERVICES

<i>Vendor</i>	<i>Product</i>
Ab Initio Software Corp	Ab Initio CO>OPERATION™ Software
Applix	TMI, Integra, Turbo Integrator
Brio Software	Brio Software Expert Services, Brio FastTrack
Celequest Corporation	CELEQUEST 2.0 ACTIVITY SUITE
Computer Associates	CleverPath Portal
DataMirror	Expertise in deploying data warehouses and operational data stores on IBM DB2, Oracle, SQL Server, Sybase and Teradata. Real-time change data capture, transform and flow across heterogeneous data sources.
Informatica Corporation	Informatica PowerAnalyzer, Informatica Mobile, Informatica SuperGlue
Knightsbridge	End-to-end data warehousing and business intelligence solutions: information strategy, enterprise-class integration architectures, data warehousing, meta data, data delivery applications, analytic applications, client education.
Lakeview Technology Inc.	OmniReplicator™ (real-time, changed-data, cross-platform database replication)
Microsoft Consulting Services	BI Quickstart - proof of concept for BI
MicroStrategy	MicroStrategy Technical Account Services
SAS	SAS BI Server, SAS Enterprise BI Server
Teradata, a division of NCR	Teradata Solutions Methodology
Unisys Corporation	Data Warehouse Systems Workshop, Data Warehouse Performance Assessment, and Infrastructure Implementation Planning Services

VIII. Hospitality Suites and Labs -----

HOSPITALITY SUITES

The following sponsored events offered attendees a chance to enjoy food, entertainment, informative presentations, and networking in a relaxed, interactive atmosphere.

Monday Night

- Cognos Inc.: *A Recipe for Success*
- Firstlogic Inc.: *Data Profiling: It's Not Magic!*
- SAS: *SAS Cocktail Reception*

Tuesday Night

- Hyperion: *The Future of Business Intelligence Is Now!*
- Microsoft Corporation: *Beach Party Blast*
- Teradata, a division of NCR: *Tera TV Party*

HANDS-ON LAB (Wednesday Night)

Hands-on Labs offer the chance to learn about specific business intelligence and data warehousing solutions.

- Teradata, a Division of NCR: *Hands-On Teradata*

IX. Onsite Training, Upcoming Events, and Publications -----

TDWI Onsite Courses

A cost-effective way to train your team in your own environment.

TDWI Onsite Courses offer a convenient and cost-effective way to give your entire team an equivalent understanding of data warehousing and business intelligence concepts. We can tailor TDWI's courses to meet your company's unique challenges and issues, and the skill levels of team members. For more information, contact Yvonne Baho at 978.582.7105 or ybaho@dw-institute.com, or visit <http://www.dw-institute.com/education/courses/index.asp>.

2004 TDWI Seminar Series

In-depth training in a small class setting.

Whether you are embarking on a new data warehousing project or working in a mature business intelligence environment, TDWI Seminars offer courses to meet your specific needs and advance your project goals. From the fundamentals of business intelligence to advanced techniques for data modelers, you will learn concepts and techniques to accelerate your professional development. Additionally, TDWI seminars are offered throughout the US and Canada, so you can get the training you need when and where your schedule allows.

New York, NY	March 8–11
St. Louis, MO	March 29–April 1
Vancouver, BC	April 19–22
Chicago, IL	June 7–10
Anaheim, CA	June 28–July 1
Toronto, ON	July 12–15
Minneapolis, MN	September 13–16
Washington, D.C.	October 4–7

New for 2004, TDWI also offers Hands-On BI labs: Three-day series designed to provide real-world exercises in a simulated BI environment with a variety of tools.

March 15-17, Cleveland
April 13-15, Minneapolis
June 14-16, Seattle

For more information on course offerings and *free* evening events in most locations, please visit: <http://dw-institute.com/education/seminars/index.asp>.

Upcoming TDWI World Conferences

Winter 2004

<http://www.dw-institute.com/education/conferences/lasvegas2004/index.asp>

BI Strategies: Creating an Event-Driven Organization

Bally's Las Vegas

Las Vegas, NV

February 15–20, 2004



TDWI World Conference—Fall 2003 Post-Conference Trip Report

Spring 2004

Boston, MA: Boston Marriott
Copley Place
May 9–14, 2004

Summer 2004

San Diego, CA:
Manchester Grand Hyatt
August 8–13, 2004

Fall 2004

Orlando, FL:
JW Marriott Grande Lakes
Oct. 31–Nov. 5, 2004

TDWI Online

TDWI's Marketplace Online provides you with a comprehensive resource for quick and accurate information on the most innovative products and services available for business intelligence and data warehousing today.

Visit <http://www.dw-institute.com/marketplace/index.asp>

Recent Publications

- *Business Intelligence Journal, Volume 8, Number 4* contains articles, research, book reviews, case studies, and expert perspectives from leading industry and academia gurus furthering the practice of BI and DW. A Members-only publication.
- *What Works: Best Practices in Business Intelligence and Data Warehousing*, (volume 16), a compendium of industry case studies and Lessons from the Experts.
- *Ten Mistakes to Avoid When Identifying Data Warehouse Requirements* (Quarter 4). This series examines the 10 most common mistakes managers make in developing, implementing, and maintaining BI and DW implementations. A Members-only publication.
- *Building the Real-Time Enterprise*, part of the 2003 Report Series, with findings based on interviews with industry experts, leading-edge customers, and survey data.
- *TDWI's Game of Business Intelligence*. TDWI's annual poster depicting a BI or DW process or lifecycle.
- *Data Warehousing Salaries, Roles, and Responsibilities Report*, a survey that provides an in-depth look at how data warehousing professionals spend their time and how they are compensated. A Members-only publication.

For more information on TDWI Research please visit <http://dw-institute.com/research/index.asp>